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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,738	08/28/2003	Suk Won Choi	049128-5124	5697

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EXAMINER

QI, ZHI QIANG

ART UNIT PAPER NUMBER

2871

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/649,738	Applicant(s) CHOI ET AL.	
	Examiner Mike Qi	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4-5, 9, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,514,426 (Eguchi) in view of US 6,614,491 (Hasegawa et al).

Claims 1 and 9, Eguchi discloses (col.5, lines 37 – 53; col.7, lines 23 – 30; Fig.1)

that a liquid crystal display comprising:

- a liquid crystal (15) is disposed (injected) between a pair of substrate (11a, 11b) (upper and lower plates) which coated with transparent electrodes (12a, 12b) (wherein the upper and lower plates have electrodes respectively formed thereon;
- an upper alignment film (14a) formed on the upper plate (11a);
- a lower alignment film (14b) formed on the lower plate (11b);
- in order to provide the alignment film with a better alignment effect, it is preferred to rub the surface of the alignment film, and the rubbing is applied to only one of the substrates or both substrate each having an alignment film (col.7, lines 23-30), i.e., only one of the alignment film on the upper plate and the lower plate is aligned so as to determine an incipient alignment direction of the liquid crystal;

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- to assemble the device, the upper plate and the lower plate must be assembled;
- polarizers (17a,17b) mounted on external surfaces of the upper and lower plates (11a, 11b) respectively.

Eguchi does not explicitly disclose that a tilt long axis of the liquid crystal (i.e., the optical axis of the liquid crystal molecules) is coincident with a transmission axis of at least one of the polarizers.

However, Hasegawa discloses (col.9, line 44 – col.10, line 6; Fig.1) that the transmitting axis of one polarizer (38) was parallel to the optical axis of the liquid crystal molecules (50), i.e., a tilted long axis of the liquid crystal is coincident with a transmission axis of one of the polarizers. Hasegawa indicates (col.9, lines 55-66) that in such case, the light was hardly leaked out from the non-pixel portion, so that a higher contrast and more wide viewing angle obtained.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to arrange a tilted long axis of the liquid crystal is coincident with a transmission axis of at least one of the polarizers as claimed in claims 1 and 9 for preventing the light leakage so as to obtain a higher contrast and more wide viewing angle display.

Claims 2 and 10, Eguchi discloses (col.5, lines 37 – 53; Fig.1) that the liquid crystal (15) is a ferroelectric liquid crystal.

Claims 4 and 5, Eguchi discloses (col.7, lines 23 – 30) that in order to provide the

alignment film with a better alignment effect, it is preferred to rub the surface of the alignment film, and the rubbing is applied to only one of the substrates or both substrate each having an alignment film (to align the upper alignment film as claimed in claim 4 or to align the lower alignment film as claimed in claim 5).

Claim 12, Eguchi discloses (col.11, lines 27 –43; Fig.4) that the orientation of the ferroelectric liquid crystal cell shows bistability; and when the electric field E_a is applied to the liquid crystal molecules, they are oriented in the first stable state (33a); and when the electric field E_b is applied to the liquid crystal molecules, the liquid crystal molecules are oriented to the second stable state (33b); and as long as the magnitude of the electric field being applied is not above a certain threshold value, the liquid crystal molecules are placed in the respective orientation states. Therefore, in order to obtain a certain orientation state, when injecting the liquid crystal between the two substrates, a certain electric field must be applied, and such electric field is for maintaining an incipient alignment direction of the liquid crystal.

3. Claims 6,15-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eguchi and Hasegawa as applied to claims 1, 2, 4-5, 9, 10 and 12 above, and further in view of US 5,618,592 (Nagae et al).

Claims 15 and 16, lacking limitation is such that an alignment film formed (printing) on one of the upper plate and a lower plate.

However, Nagae discloses (col.8, lines 7 – 53) that the alignment film is formed on only one of the electrodes, especially, when the alignment film is formed on a TFT substrate for achieving smaller spherulites in an alignment film which had been difficult

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to be accomplished before. Nagae indicates (col.2, lines 19-22) that an alignment film having a smaller spherulite diameter provides better display characteristics such as better contrast ratio.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use an alignment film on one substrate as claimed in claims 15 and 16 for achieving smaller spherulites in an alignment film which had been difficult to be accomplished before, so as to obtain a better display characteristics such as better contrast ratio.

Claim 17, Eguchi discloses (col.5, lines 37 – 53; Fig.1) that the liquid crystal (15) is a ferroelectric liquid crystal.

Claims 6 and 19, Eguchi discloses (col.5, lines 43 – 53) that the liquid crystal layer (15) with a thickness (cell gap) 0.1 – 3 microns which is sufficiently small to suppress the formation of a helical structure of the liquid crystal (15), and that the cell gap is overlap with the cell gap 1.4 – 1.5 microns as claimed in claims 6 and 19. In the case where the claimed ranges “overlap or lie inside ranges disclosed by the prior art” a prima facie case of obviousness exists (see MPEP 2144.05 I).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use thin cell gap such as 1.4 – 1.5 microns as claimed in claims 6 and 19 for suppressing the formation of a helical structure of the liquid crystal.

4. Claims 3, 11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eguchi, Hasegawa and Nagae as applied to claims 1, 2, 4-6, 9-10, 12, 15-17 and 19 above, and further in view of US 6,545,738 (Son et al).

Claims 3, 11 and 18, lacking limitation is such that the liquid crystal is a ferroelectric liquid crystal of Half V-switching mode.

However, Son discloses (col.1, lines 30-44; Fig.5) that the half V-shape FLC (ferroelectric liquid crystal) (see Fig.5 of half V-shape mode that is the half V-switching mode) has a primary alignment state better than that of the V-shape FLC, and the half V-shape FLC enhances a contrast ratio and enables the liquid crystal to be easily driven.

Therefore, it would have been obvious to those skilled in the art at time the invention was made to use ferroelectric liquid crystal of half V-switching mode as claimed in claims 3, 11 and 18 for enhancing the contrast ratio and driving the liquid crystal easily.

5. Claims 7-8, 13-14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eguchi, Hasegawa and Nagae as applied to claims 1, 2, 4-6, 9-10, 12, 15-17 and 19 above, and further in view of US 4,709,994 (Kanbe et al).

Claims 7-8, 13-14 and 20, lacking limitation is such that a transmissive axis of one of the polarizers is at an angle within 1 to 10 degree (preferably 3 to 7 degree) with respective to alignment direction of aligned one of the alignment films.

However, Kanbe discloses (col.6, lines 48– 66; Fig.3) that under certain condition, forming an angle between the rubbing direction (axis O) (the alignment direction) and the transmission axis of a polarizer (P1) is 6 degree, the display having a maximum contrast. In the case where the claimed ranges "overlap or lie inside ranges

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disclosed by the prior art" a prima facie case of obviousness exists (see MPEP 2144.05 I).

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to set an angle 1 to 10 degree (preferable 3 to 7 degree) of a transmissive axis of a polarizer with respect to an alignment direction of the aligned one of the alignment films as claimed in claims 7-8, 13-14 and 20 for achieving a maximum contrast.

Response to Arguments

6. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1) US 4,639,089 (Okada et al) discloses (col.8, lines 22 – 44; Fig.2) that in order to effectively realize high response speed and bistability, it is preferable that the thickness of the cell is as thin as possible.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299. The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



DUNG T. NGUYEN
PRIMARY EXAMINER

Mike Qi
May 9, 2005